

7 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

This chapter of the Program EIR/EIS describes any potentially significant adverse environmental effects, identifiable at the program level of environmental review, which cannot be avoided should the proposed HST system or an alternative be implemented and any unavoidable adverse impacts of the alternatives, as required by CEQA and NEPA, respectively. This chapter also describes any significant irreversible or irretrievable commitments of resources or foreclosures of future options, identifiable at the program level of environmental review, that would be involved in the proposed HST system or alternatives should one be implemented.

This Program EIR/EIS represents the first conceptual planning stage of a tiered environmental evaluation that analyzes a broad range of alternatives and HST alignment options. Most potentially significant impacts that have been described in previous sections of this document can be avoided or minimized by selecting an alternative or alignment option that avoids or minimizes impacts on environmental resources through refinement to the design or specific location of the alignment or station, or through incorporation of mitigation measures. For example, some potentially significant impacts on sensitive habitat or wetlands would occur in areas where alignment options are available that would avoid or minimize the impact, such as tunneling or designing the alignment to avoid the sensitive area. In addition, potential noise impacts would occur in residential areas along the alignment corridors where significant noise levels could be reduced to less than significant with implementation of mitigation measures such as noise walls between the train track or highway and the residential receptors. However, there are some unavoidable potentially significant impacts that could occur as a result of implementation of the alternatives under consideration. Those impacts are discussed below.

7.1 ADVERSE UNAVOIDABLE POTENTIALLY SIGNIFICANT IMPACTS

7.1.1 Fuel Consumption and Energy Use

Potentially significant impacts of the No Project and Modal Alternatives that cannot be mitigated or reduced to less than significant include consumption of an estimated 24.3 million barrels of oil per year under the No Project Alternative in 2020, and 24.5 million barrels per year under the Modal Alternative. Both the No Project and Modal Alternatives would continue California's dependency on automobiles and airplanes for intercity travel, and the Modal Alternative would potentially increase the use of this non-renewable resource for intercity trips over No Project energy consumption by 6.8 to 7.0 million barrels of oil per year. The HST Alternative would consume an estimated 19.1 million barrels of oil per year. The proposed HST Alternative would consume an estimated 2.0 to 5.2 million fewer barrels of oil per year (a 22% difference) than the 2020 No Project baseline.

Operation of the proposed HST Alternative would potentially increase the load on the statewide electric power system by an estimated 480 megawatts (MW) during the peak period in 2020. Overall, the HST electricity demand would represent about 0.6% of an estimated 77,000 MW statewide demand in 2020. During construction, energy consumption for the Modal Alternative is estimated to be about 241 million British thermal units (MMBTUs) compared to an estimated 152 MMBTUs for construction of the proposed HST system (37% less than the Modal Alternative).

7.1.2 Biological Resources and Wetlands, Agricultural Land, Section 4(f) and 6(f) Resources, Cultural and Paleontological Resources, and Visual Resources

The Modal and HST Alternatives would each commit the use of land and natural resources to a transportation right-of-way. Some potentially significant unavoidable impacts on biological resources (habitat for threatened and endangered species, and wetlands) might occur where the land required for

right-of-way for highway expansion or for a proposed HST alignment contains wetlands or wildlife habitat for special-status species. Some potentially significant unavoidable impacts on agricultural land may occur where the land required for right-of-way is in agricultural use. Similarly, potential unavoidable impacts on Section 4(f) and 6(f), cultural, and visual (scenic landscapes) resources could occur where alignment options (tunnels, elevated alignments, or right-of-way adjustments) would not be feasible or practicable. Both interstate highways and the proposed HST alignments would require relatively straight, flat, long linear features; moving or curving the alignment to avoid resources might not always be feasible, and could result in impacts on other resources. Similar effects would occur from property acquisition and land use along the width and length of the modal and proposed HST corridors.

Only general statements of potential impacts can be made at this program level of review because field studies were not conducted and the buffer area used for the analysis was many times larger than the actual right-of-way for the alternatives under consideration in most instances. Potential impacts would need to be further studied and clarified in the next stage of project design and environmental review, when more specific information would be available on the right-of-way needed for proposed alignments and station locations, and on the specific properties potentially affected. The objective at the project-specific stage of analysis would be to identify design options (plans and profiles) that would avoid these sensitive resources to the extent feasible.

7.1.3 Construction Impacts

Construction of either the Modal or HST Alternative would result in the irreversible commitment of resources. Fossil fuels, labor, and construction materials would be expended in the construction of the Modal and HST Alternatives. Further, labor and natural resources would be used in the fabrication and preparation of construction materials. Once used or expended, these materials are generally not retrievable. However, these materials are not in short supply and their use would not have an adverse effect on the continued availability of resources. Any construction of the proposed alternatives would also require the expenditure and allocation of local, state, and federal funds, which are not retrievable. Once used, these funds could not be used for other projects.

Short-term construction impacts related to earthwork (cut and fill and grading) that would result in dust (PM10) and localized emissions and noise from construction equipment would occur under either the Modal or HST Alternative. These impacts would be in addition to the construction impacts associated with already planned projects included in the No Project Alternative. Because the construction period would last at least 10 years and the miles of corridor under construction at one time would extend across the state, these physical impacts would potentially be significant. The potential impacts of this construction activity would be addressed in more detail during project-level analysis. This same construction activity would also have potential benefits to employment and to the California economy from construction jobs and contracts for the services and materials. The California High Speed Rail Authority's final business plan (Business Plan) (California High Speed Rail Authority 2000) describes an estimated 300,000 job-years of employment during HST construction that would generate an estimated \$11 billion in personal income, \$28 billion in industrial output, and \$871 million in tax revenue.

7.2 RELATIONSHIP BETWEEN SHORT-TERM USES OF ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Any change to the statewide transportation system of the magnitude needed to meet the projected intercity travel demand in California by the year 2020 would have short-term effects on the human and physical environment, and enhance long-term productivity and reduce risks to health and safety. Implementation of the proposed alternatives would result in short-term population changes from relocations associated with potential property acquisitions, and potential relocation of wildlife from habitat disturbance during construction and operation. These factors would be considered in more detail during

project-level review. While some relocations associated with property acquisition are likely if a decision is made to proceed with the proposed HST system, long-term benefits would also result, including enhanced long-term productivity related to increased mobility and safety, and the reduced travel time, air pollutant emissions, and energy use that an improved intercity transportation system would provide.

Short-term benefits of the Modal and HST Alternatives include employment opportunities during construction (spread over 12 years) and locally purchased materials and services.

As indicated in Chapter 1, *Purpose and Need and Objectives*, the existing and programmed transportation improvements in California will not keep up with the currently projected rate of future population growth and the increased intercity travel demand projected for California. As described in Chapter 5, *Economic Growth and Related Impacts*, the proposed HST system would provide user benefits (travel time savings, cost reductions, and accident reductions) and accessibility improvements for California's citizens. The HST system would improve accessibility to labor and customer markets, thereby improving the competitiveness of the state's industries and the overall economy. With this second effect, businesses that chose to locate in proximity to an HST station could operate more efficiently than businesses that locate elsewhere. The analysis shows that the HST Alternative would be the most efficient in terms of the land consumed per new job and resident, and could provide an incremental development density that is 4.0% more efficient than the No Project Alternative, while the Modal Alternative would be 2.3% less efficient than the HST Alternative.

7.3 CALIFORNIA ENVIRONMENTAL QUALITY ACT SIGNIFICANCE

This section describes those environmental effects identified in Chapter 3 that would be considered significant under CEQA. The potential for the proposed project and alternatives to stimulate unplanned growth is considered in Chapter 5, *Economic Growth and Related Impacts*. Cumulative impacts are discussed in Section 3.17, *Cumulative Impacts Evaluation*.

Use of the term "significant" differs under NEPA and CEQA. While CEQA requires that the significance of impacts be discussed in an EIR, NEPA does not require such discussion in an EIS. Under NEPA, significance is used to determine whether an EIS or some other level of documentation is required, and once a decision to prepare an EIS is made, the EIS reports all impacts and discusses feasible mitigation. Under CEQA, significance is used to determine whether to prepare an EIR, and then to evaluate the severity of potential adverse environmental impacts in the EIR. The EIR must also discuss feasible mitigation measures that could reduce potentially significant effects. For this reason, CEQA significance criteria and the determination of significant impacts under CEQA have been addressed separately in this section.

NEPA anticipates that mitigation will be considered where feasible for the potential impacts of a project. Therefore, while consideration of some mitigation strategies described in this EIR/EIS and in this section is appropriate under NEPA, the potential impacts they address may not be considered significant under CEQA.

7.3.1 California Environmental Quality Act Significance Thresholds

CEQA requires that an EIR identify the potentially significant environmental effects of the project (CEQA Guidelines Section 15126), but does not promulgate specific thresholds for significance. Instead, CEQA Guidelines Section 15064(b) states that "the determination...calls for careful judgment on the part of the public agency involved..." and that "an ironclad definition of significant effect is not possible because the significance of an activity may vary with the setting." The fundamental definition of significant effect under CEQA is "a substantial adverse change in physical conditions." This criterion underlies the evaluation of environmental impacts for most of the impact issues identified in the CEQA Environmental

Checklist Form (Guidelines Appendix G). CEQA encourages lead agencies to develop and publish their own thresholds of significance for the purpose of determining the significant effects of their projects. Given the planning-level impact analysis considered in this Program EIR/EIS, the Authority has not developed project-specific significance thresholds.

Some impact categories lend themselves to scientific or mathematical analysis, and therefore to quantification. Some categories have significance thresholds established by regulatory agencies, such as noise criteria or regional air pollutant criteria. For other impact categories that are more qualitative or are entirely dependent on the immediate setting, a hard-and-fast threshold is not generally feasible, and the "substantial adverse change in physical conditions" is applied as the significance criterion. In the current analysis, the CEQA checklist thresholds have been used to evaluate the significance of effects of the HST Alternative.

CEQA states that economic and social changes resulting from a project shall not be treated as significant effects on the environment (CEQA Guidelines, 15064[e]). Economic or social changes may be used, however, to determine that a physical change should be regarded as a significant effect on the environment. Where a physical change is caused by economic or social effects of a project, it may be regarded as a significant effect in the same manner as any other physical change resulting from the project. If it causes adverse economic or social effects on people, those adverse effects may be used as a factor in determining whether the physical change is a significant effect on the environment. Where the Modal or HST Alternative would involve widening or expanding existing transportation rights-of-way, the potential for adverse environmental impacts and for potential economic or social effects is limited, since the transportation corridor and its associated impacts are already well established. Where the Modal or HST Alternative would involve new transportation facilities on new right-of-way (e.g., stations or alignment), or would bring large numbers of people to new station areas, however, there is greater potential for significant effect.

7.3.2 Significant Unavoidable Adverse Effects

This section identifies those environmental categories that, given their potential for impact, would be those most likely to experience potentially significant unavoidable adverse effects at some locations along the alignments being considered for the proposed HST system. The planning level of environmental review presented in this Program EIR/EIS does not seek to quantify impacts as would typically be done at a project level. Instead, this Program EIR/EIS evaluates the potential for significant effects for each alternative based on the density of resources and/or sensitive receptors within the project vicinity and ranks the potential for impact as high, medium, or low. This is an appropriate assessment of potential impacts at this stage of such a large, statewide undertaking. The Program EIR/EIS considers alternatives and options, identifies the lesser-impact approaches in each corridor or segment, and provides a basis for identifying mitigation strategies that is relevant to the decisions at hand.

Based on this planning level of analysis, potentially significant unavoidable impacts are only identified generally. With the statewide scope of the project, and the size and diversity of the geographic areas traversed by the potential HST alignment, station options, and project alternatives, it is likely not feasible to avoid or reduce all of the potentially significant impacts of the proposed HST system at every location under consideration through project modifications, or to mitigate all these potential impacts to a less-than-significant level. Table 7.3-1 provides a summary list of the environmental categories, general mitigation strategies, potentially significant impacts, and potential levels of significance after mitigation. Depending on the alignment options that may ultimately be selected, potentially significant unavoidable effects can be expected at some locations within the proposed HST system in the general environmental categories of agricultural lands, biological resources and wetlands, hydrology and water resources, and cultural resources. However, neither the extent of such potential impacts, nor the potential locations for such impacts, can be determined at this level of analysis. For several of the environmental categories listed in the table below (including agricultural lands, wetlands, hydrology, and cultural resources), the

quantities presented represent areas within which potential impacts might occur by including all the potentially affected resources or acreage in the study area for the resource topic listed. For example, the area of floodplains includes all floodplains within 100 feet (ft) (30 meters [m]) of either side of the centerline of the alignment being considered, whereas the right-of-way needed (e.g., 25 ft [8 m] on either side of centerline for the proposed HST system) for the improvements considered and the area that would be used for the improvements (e.g., the footprint for the proposed HST system) would be much less, so the potential for impacts would likewise be less. Therefore, the determination of significance is potential rather than absolute. The determination of a potentially significant or unavoidable impact would be used to focus attention at the next phase of planning and environmental review (project-specific, detailed analysis).

7.3.3 California Environmental Quality Act Environmentally Superior Alternative

The CEQA Guidelines state that, where the No Project Alternative is the environmentally superior alternative, the EIR shall also identify the environmentally superior alternative from among the other alternatives (CEQA Guidelines 15126.6[e][2]). Based on the evaluations documented in Chapter 3 of this Program EIR/EIS, the HST Alternative has been identified as the environmentally superior alternative.

**Table 7.3-1
Summary of Key Environmental Impact/Benefits of Alternatives**

Key Environmental Issues	Alternative			Mitigation Strategy for HST	Potential Significance for HST	
	No Project	Modal	HST		Before Mitigation	After Mitigation
Traffic and Circulation	Capacity is insufficient to accommodate projected growth. Over half of 68 intercity highway segments considered would operate at unacceptable levels of service with increased congestion, travel delays, and accidents compared to existing conditions. Congestion would increase.	Congestion reduction on intercity highways compared to the No Project and HST Alternatives. However, the analysis could not account for potential use of the excess capacity by non-intercity (commuter and short-distance) trips. Congestion and travel delays on surface streets leading to and from highways/airports.	Congestion reduction on intercity highways compared to the No Project Alternative. However, the analysis could not account for potential use of excess capacity by non-intercity (commuter and short-distance) trips. 34 million fewer long-distance automobile passengers on highways. Localized traffic conditions around stations impacted.	Encourage use of transit to stations. Work with transit providers to improve station connections.	Potentially significant	Potentially less than significant/ potentially significant/ unavoidable
Travel Conditions (travel time, reliability, safety, connectivity, sustainable capacity, passenger cost)	Longer travel times, more delay. Lower reliability due to dependence on the automobile. Increase in injuries and fatalities due to increase in highway travel. No net improvement to connectivity options. No significant increase in capacity for highway or air	Travel time reduction compared to the No Project Alternative. Improved reliability over No Project due to increased capacity. Increase in injuries and fatalities due to more highway travel. No new modes introduced; additional air frequency. Modal improvements would provide sufficient capacity to	Travel time reduction compared to the No Project Alternative. Greatest improvement in reliability due to high reliability of HST mode; significant levels of diversion to HST from auto and air result in reduced congestion; and additional modal option improves reliability for overall transportation system. Decrease in injuries and fatalities due to diversion of trips from highways.	N/A	Beneficial	N/A

Key Environmental Issues	Alternative			Mitigation Strategy for HST	Potential Significance for HST	
	No Project	Modal	HST		Before Mitigation	After Mitigation
	infrastructure, and significant worsening of congestion due to increased demand.	meet representative demand, but would have little or no capacity beyond that level. Passenger costs approximately the same as the No Project Alternative.	Highest level of connectivity. New mode would add a variety of connections to existing modes, additional frequencies, and greater flexibility. HST system would provide sufficient capacity to meet representative demand and would provide substantial additional capacity with minimal additional infrastructure. HST system would provide a release valve for the existing intercity modes. Overall savings in passenger costs of 8% to 44% compared to No Project, depending on the origin and destination of travel. HST passenger costs are competitive with the automobile travel and less expensive than air travel.			
Air Quality (Conformity Rule; tons of pollutants)	Emissions predicted to decrease in 2020 due to low emission vehicles; PM10 to increase statewide. Estimated CO 806,304 tons/year, NO _x 187,972 tons/year, TOG 121,222 tons/year; CO ₂ 374 million tons/year.	Vehicle miles traveled increase by 1.1% over 2020 No Project. CO 812,801 tons/year; NO _x 189,238 tons/year; TOG 122,049 tons/year; CO ₂ 374 million tons/year.	Air quality benefit. Decrease in pollutants compared to No Project: CO 799,204 to 803,140 tons/year; NO _x 185,232 to 186,384 tons/year; TOG 120,510 to 120,895 tons/year; CO ₂ 368 to 372 million tons/year (0.45% to 1.4% less than No Project). (Range based on low- to high-end ridership forecasts.)	Control of construction-related emissions.	Beneficial	N/A

Key Environmental Issues	Alternative			Mitigation Strategy for HST	Potential Significance for HST	
	No Project	Modal	HST		Before Mitigation	After Mitigation
Energy Use	24.3 million barrels of oil consumed annually in 2020; 6.8 million over existing conditions.	Higher total energy consumption—24.5 million barrels of oil in 2020. Higher construction energy consumption 241 MMBtus.	Energy benefit. Lower total energy consumption: 19.1 million (high-end ridership) and 22.3 million (low-end) barrels of oil in 2020; overall decrease of 2.0 to 5.2 million barrels of oil compared to No Project. Increase in electric power demand/use of natural gas. Lower construction energy consumption: 152 MMBtus (high-end ridership) and 127 MMBtus (low-end ridership).	Develop and implement energy conservation plan for construction.	Beneficial	N/A
Land Use (compatibility and property impacts)	Expansion of urban sprawl as population grows and congestion increases; development on open space and agricultural lands.	Improved access to outlying areas and communities; sprawl; incompatible with transit-first policies. High property acquisition impacts along constrained existing rights-of-way in heavily urbanized areas; 309 mi (497 km) (20% of corridor) would affect high-impact land uses.	Controlled growth around stations, urban in-fill; compatible with transit-first policies. Majority of property acquisition along existing rights of way, some acquisition along new rights of way in undeveloped areas; between 53 and 88 mi (85 and 142 km) of HST would affect high impact land uses. (Range based on alignment options selected to comprise the HST system.)	Continued coordination with local agencies. Explore opportunities for joint and mixed-use development at stations. Relocation assistance during future project-level review.	Potentially significant	Potentially less than significant

Key Environmental Issues	Alternative			Mitigation Strategy for HST	Potential Significance for HST	
	No Project	Modal	HST		Before Mitigation	After Mitigation
Visual Quality	No predictable change to existing landscape.	Low to moderate contrasts along existing highways and airports; high contrasts through mountain crossings and natural open space landscapes.	Moderate to high visual contrasts for elevated structures; high sensitivity in scenic open space and mountain crossings.	Design strategies to minimize bulk and shading of bridges and elevated guideways. Use neutral colors and materials to blend with surrounding landscape features.	Potentially significant	Potentially less than significant/ potentially significant/ unavoidable
Noise	More traffic and more air operations from growth in the intercity demand generate more noise.	210 mi (338 km) or 14% of total highway corridor miles improved would have high impacts on noise-sensitive land use/populations. The Modal Alternative would include five additional runways statewide in heavily urbanized areas. Noise is one of the most prominent factors in the environmental acceptability of airport improvement expansion and is often the limiting factor in approval of such improvements.	21 to 107 mi (34 to 172 km) or 3% to 14% of alignment length statewide would have high impacts on noise-sensitive land use/populations; with mitigation, 0% of alignment would have high impacts. Noise increase due to additional high-speed train frequencies. Noise reduction from existing conditions due to elimination of horn and crossing gate noise resulting from grade separation of existing grade crossings. (Range based on alignment options selected to comprise the HST system.)	Consider sound barriers along noise-sensitive corridors; track treatment for vibration.	Potentially significant	Potentially less than significant

Key Environmental Issues	Alternative			Mitigation Strategy for HST	Potential Significance for HST	
	No Project	Modal	HST		Before Mitigation	After Mitigation
Farmland (includes area within 50 ft [15 m] on each side of alignment centerline [100 ft or 30 m total])	No predictable change from existing conditions as a result from the No Project transportation improvements. Continued loss of farmland in California at rate of 49,700 ac (20,113 ha) per year from population growth and urbanization (845,000 ac [341,960 ha] by 2020).	Right-of-way needs of the improvements could potentially impact a total of 1,118 ac (452 ha) of farmlands.	Right-of-way needs of the HST could potentially impact a total of 2,445–3860 ac (989–1,562 ha) of farmlands. New corridor alignments through farmlands could have potential severance impacts. (Range based on alignment options selected to comprise the HST system.)	Avoid or reduce impacts by sharing existing rail rights-of-way to the maximum extent possible and avoiding alignment options in established farmlands. Consider farmland preservation strategies.	Potentially significant	Potentially significant/unavoidable
Biological Resources and Wetlands (Includes area within 50 ft [15 m] on each side of alignment centerline; 100 ft or 30 m total)	No predictable change from existing conditions.	1,476 ac (597 ha) of sensitive habitat; 100ac (40 ha) of wetland; 90 special-status species.	1,201 to 1,568 ac (486 to 635 ha) of sensitive habitat; 30 to 89 ac (12 to 36 ha) of wetland; 67 to 84 special-status species. (Range based on alignment options selected to comprise the HST system.)	Work with resource agencies to develop site-specific mitigation and impact avoidance strategies for project-level review in coordination with local and regional plans and policies.	Potentially significant	Potentially significant/unavoidable

Key Environmental Issues	Alternative			Mitigation Strategy for HST	Potential Significance for HST	
	No Project	Modal	HST		Before Mitigation	After Mitigation
Hydrology and Water Resources (floodplains include area within 100 ft [30 m] on each side of alignment centerline [200 ft or 61 km total]; streams and lakes include area within 50 ft [15 m] on each side of centerline [100 ft or 30 m total])	No predictable change from existing conditions.	5,540 ac (2,242 ha) of floodplains, 39,520 linear ft (12,045 m) of streams, 25 ac lakes (10 ha) within 50 ft (15 m).	1,865 to 3,873 ac (755 to 1,567 ha) of floodplains; 22,600 to 32,400 linear ft. (6,888 to 9,875 m) of streams; 7 to 27 ac (3 to 11 ha) of lakes within 50 ft (15 m). (Range based on alignment options selected to comprise the HST system.)	Avoid or minimize footprint in floodplains; conduct project-level analysis of surface hydrology and coastal lagoons; BMPs for construction as part of Storm Water Pollution Prevention Plan.	Potentially significant	Potentially less than significant / potentially significant/unavoidable
Section 4(f) and 6(f) (Public Parks and Recreation) (includes area within 900 ft [274 m] on each side of alignment centerline [1,800 ft or 549 m total])	No predictable change from existing conditions.	132 Section 4(f) properties potentially affected; 8 wildlife refuges.	54–89 Section 4(f) properties potentially affected; 1–6 wildlife refuges. (Range based on alignment options selected to comprise the HST system.)	Consider design options to avoid parkland and wildlife refuges; identify potential site-specific mitigation measures.	Potentially significant	Potentially less than significant / potentially significant/unavoidable



Key Environmental Issues	Alternative			Mitigation Strategy for HST	Potential Significance for HST	
	No Project	Modal	HST		Before Mitigation	After Mitigation
Cultural Resources (including Section 4(f) historical resources)	Low ranking for impacts on archaeological resources and historic property.	Medium ranking for potential impacts on archaeological resources and historic properties.	Medium to high ranking for potential impacts on archaeological resources and historic properties (HST would use existing rail corridors and some stations and nearby resources developed in historic period).	Develop procedures for fieldwork, identification, evaluation, and determination of effects for cultural resources in consultation with State Historic Preservation Office and Native American Tribes.	Potentially significant	Potentially significant/unavoidable

Key Environmental Issues	Alternative			Mitigation Strategy for HST	Potential Significance for HST	
	No Project	Modal	HST		Before Mitigation	After Mitigation
Growth Potential	Statewide population is expected to grow by about 54%, statewide employment is expected to increase by 46%, and urbanized areas are expected to increase by 48% between 2002 and 2035.	Statewide population is expected to grow by 55% between 2002 and 2035 (360,000 more than No Project), statewide employment is expected to increase by 47% (250,000 jobs more than the No Project), and urbanized areas are expected to increase by 50% (65,500 ac [26,507 ha] more than the No Project) between 2002 and 2035. Increased development at major interchanges along highways and around airports; sprawl, particularly in Central Valley region.	Statewide population is expected to grow by 56% between 2002 and 2035 (700,000 more than No Project), statewide employment is expected to increase by 48% (450,000 jobs more than the No Project), and urbanized areas are expected to increase by 48% (2,600 ac [1,052 ha] less than the No Project). Transit-oriented development around stations; planned growth consistent with RTPs; growth around Merced.	Work with local communities to encourage higher density development around stations.	Potentially beneficial	N/A
Public Utilities	No impact.	Potential conflicts with 831 utilities.	Potential conflicts with 545 to 812 utilities, depending on alignments.	Relocate, reconstruct, or restore utility; consolidate several utilities underground into one conduit during relocation.	Potentially significant	Potentially less than significant

Key Environmental Issues	Alternative			Mitigation Strategy for HST	Potential Significance for HST	
	No Project	Modal	HST		Before Mitigation	After Mitigation
Geology	Potentially susceptible to seismic hazards.	Potentially susceptible to seismic hazards, liquefaction.	Potential seismic hazards, slope stability in cut sections.	Use of ground motion data and instruments; routine maintenance of track; slope reinforcement.	Potentially significant	Potentially less than significant
Electromagnetic Fields (EMF) and Electromagnetic Interference (EMI)	General EMF levels may be increased from low-level radiofrequency and infrared for radar and radar-like purposes, and from wireless data transfer and advanced technologies; not likely to cause significant changes in EMF or EMI levels.	Not likely to cause significant changes in EMF levels or human exposure to EMF or EMI.	Various components of HST infrastructure and trains would be sources of extremely low frequency magnetic fields, and radiofrequency EMFs; overall, HST would introduce additional EMF exposures or EMI at levels for which there are not established adverse impacts.	Design features that reduce fields at the source (overhead catenary system, substations, transmission lines; some shielding with metal panels or screens).	No significant impact	Less than significant
Hazardous Materials	Disposal, clean-up or remediation of exposure to hazardous materials during construction	Estimated 33 additional Superfund, SPL, or solid waste landfill (SWLF) sites potentially impacted	Estimated 31 to 72 additional Superfund, SPL, or SWLF sites potentially affected by construction.	Detailed Initial Site Assessment, avoid sites where practicable, sub-surface investigation where needed to characterize sites and identify remediation.	Potentially Significant	Potentially less than significant

Key Environmental Issues	Alternative			Mitigation Strategy for HST	Potential Significance for HST	
	No Project	Modal	HST		Before Mitigation	After Mitigation
ac	=	acres				
CO	=	carbon monoxide				
CO ₂	=	carbon dioxide				
ha	=	hectares				
MMBtus	=	million British thermal units				
N/A	=	not available.				
NO _x	=	oxides of nitrogen				
PM10	=	particulate matter 10 microns in diameter or less				
RTPs	=	regional transportation plans				
TOG	=	total organic gases				